

CLAIM

- 1 1. A switching network comprising:
- 2 a) a first stage of switches having input lines and output lines and comprising
- 3 m (n x k) switches, wherein m is an integer number, n is an integer number
- 4 representing the number of input lines and k is an integer number representing the
- 5 number of output lines
- 6 b) a second stage of switches comprising of m (k' x k') switches, k' is an integer
- 7 number representing the number of inputs and outputs
- 8 c) a third stage of switches comprising of m (k x n) switches
- 9 wherein k' is selected such that $m \cdot Q(k'/m) \geq k$ (where $Q(x/y)$ denotes the quotient of
- 10 dividing x by y) to allow using m switches in the second stage.

- 1 2. A switching network comprising:
- 2 m identical modules, said module further comprising
- 3 a) an input stage comprising of a (n x k) switch wherein n is an integer number
- 4 representing the number of input lines and k is an integer number representing
- 5 the number of output lines
- 6 b) a middle stage comprising of a (k' x k') switch, k' is an integer number
- 7 representing the number of inputs and outputs
- 8 c) an output stage comprising of a (k x n) switch
- 9 wherein k, k', and m satisfy $m \cdot Q(k'/m) \geq k$

- 1 3. A method of constructing a switching network comprising:
- 2 a) using m identical modules,
- 3 b) constructing said module from an input stage comprising of a (n x k) switch, a
- 4 middle stage comprising of a (k' x k') switch, an output stage comprising of a
- 5 (k x n) switch
- 6 c) selecting k' such that $m \cdot Q(k'/m) \geq k$

- 1 4. A module comprising:

- 2 a) an input stage comprising of a $(n \times k)$ switch, switch wherein n is an integer
 3 number representing the number of input lines and k is an integer number
 4 representing the number of output lines
 5 b) a middle stage comprising of a $(k' \times k')$ switch, k' is an integer number
 6 representing the number of inputs and outputs
 7 c) an output stage comprising of a $(k \times n)$ switch
 8 wherein a switching network can be constructed using m of said modules, where k , k' , and m
 9 satisfy $m \cdot Q(k'/m) \geq k$

- 1 5. A method of constructing a $v(k, n, m)$ switching network for values of m belonging to a
 2 non-empty set \mathcal{M} comprising:
 3 a) using m identical modules,
 4 b) constructing said module from an input stage comprising of a $(n \times k)$ switch, a
 5 middle stage comprising of a $(k' \times k')$ switch, an output stage comprising of a
 6 $(k \times n)$ switch
 7 c) selecting k' such that $m \cdot Q(k'/m) \geq k$ for all values of m belonging to set \mathcal{M}